

Alternative 9

Additional export Capacity with South of Delta Storage

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Emphasis

This alternative increases the yield from the Delta by increasing the export pumping capacity to the physical capacity of the facilities during high flow winter periods (November-February). Pumping would be managed through a new off-stream storage facility on the west side of the San Joaquin Valley and through an in-lieu groundwater banking program. This alternative would increase supply availability for all users without physical modifications in the Delta.

Distinguishing Features

Physical and Structural Features

An off-stream storage facility will be constructed on the west side of the San Joaquin Valley. Storage would be filled primarily during winter when the pumps are able to operate at capacity given appropriate hydrological and ecological conditions. Moderate levels of habitat restoration and levee improvements are included to ensure ecological viability of the Delta and system integrity for water supplies. Hatcheries will be constructed and/or expanded on the San Joaquin River and its tributaries to enhance fall-run salmon populations.

Operational and Management Features

Operations of the export facilities will be modified to allow pumping at capacity during appropriate winter months when conditions allow. Increased winter pumping to fill off-stream storage will decrease the need to pump during more ecologically sensitive periods and increase the availability from upstream reservoirs. Capacity for transfers would be increased. Project water or transfer water would be available for in-lieu groundwater banking in the San Joaquin Valley and Tulane Lake Basin. Obtain a 100 TAF on San Joaquin River and manage for environmental purposes. Real-time monitoring for Delta exports, upstream reservoir releases, and Delta water movement will be instituted.

Institutional and Policy Features

Institutional and policy changes would be required to change export pumping capacities. An in-lieu groundwater banking program would require institutional mechanisms for management. Policy changes would be sought to improve the implementation and approval process for water transfers.

Benefits

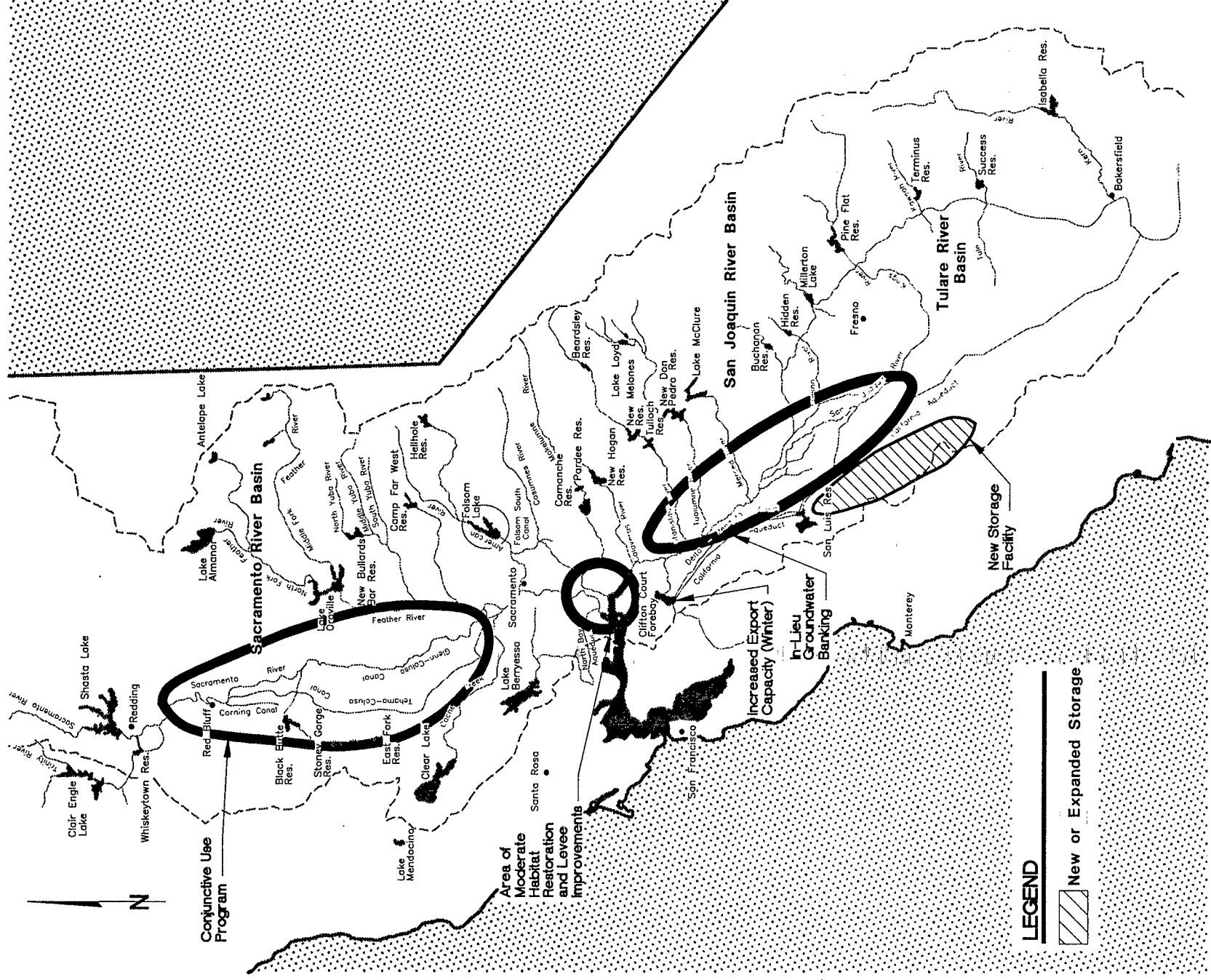
- Increases reliability and predictability of water supplies
- Improves physical habitat and levee stability
- Increases availability of upstream store water for environmental releases
- Improves reliability during drought situations
- Reduces groundwater over-draft
- Improves reliability of export supplies

Constraints and Concerns

- Mortality in south Delta export facilities remains significant
- Export water quality remains problematic
- Export supplies can still be highly constrained and remain vulnerable to interruption
- Delta islands remain vulnerable to flooding

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This alternative focuses on increasing the reliability and predictability of water supplies for Delta exporters and for the environment through increasing the permitted pumping capacity of the Delta export facilities during high flow winter periods. The increase in pumping capacity would be utilized to fill new and existing off-stream storage south of the Delta. The ability to quickly fill expanded off-stream storage facilities would: (1) shift Delta exports to more environmentally acceptable periods such as during winter peak flows; (2) reduce the Delta export needs during periods critical to fish species and water quality, particularly the spring and fall months; (3) increase the management flexibility of Delta exports; (4) increase the capacity for transfers during the summer and early fall periods, through reducing the need for project exports from the Delta; and (5) increase the availability of water for environmental needs in the Delta and its tributaries.

This alternative would include several distinctive features to increase the reliability of water supplies for exporters and the environment. This alternative would incorporate a moderate level of demand reduction in areas upstream of the Delta as well as in the export areas. Demand reduction would include implementing more stringent best management practices in the urban and agricultural sectors. An intensive in-lieu surface water - groundwater program in the southern San Joaquin Valley and Tulare Lake Basin would use available storage in over-drafted areas by providing surface water in-lieu of groundwater extraction. Because the Delta is still utilized as a conveyance vehicle to move water to the export facilities, moderate levee and habitat improvements will be implemented throughout the Delta and on upstream tributaries. Levee protection would be implemented to ensure the security of the export operation and would include extensive riparian and shallow water habitat elements. Habitat improvements would cover a wide range of habitat types, in the Delta and its tributaries, to promote increased natural production and success of key Delta species.

Physical and Structural Features

South of Delta Storage— Develop new off-stream storage south of the Delta. This storage facility would be linked to south Delta conveyance facilities to allow greater flexibility in the management of Delta exports. This facility, sized at around 1-1.5 MAF, would serve as a regulatory facility for Delta exports. It would be filled during periods of

high winter flows and would release water to meet demands south of the Delta and to decrease diversions during critical environmental periods in the Delta. The reservoir would also include an increment of carry over storage for drought insurance. Releases would also be made for in-lieu groundwater banking programs.

Migration Barriers— Install fish migration barriers at Georgiana Slough and the Delta Cross Channel to reduce fish entrainment in the interior Delta. Work to improve the effectiveness of behavioral barriers.

Delta Habitat Restoration— Restore shallow water and tidal wetland habitat in the Delta to provide spawning areas, forage areas, and escape cover for juvenile salmon, Delta smelt, splittail, and other species. Candidate areas include Prospect Island, Liberty Island, Little Holland Tract, Decker Island, Hastings Tract, Yolo Bypass, and the southeast Delta. Also restore shallow water shoreline habitat along margins of the lower Sacramento and San Joaquin channels, and tributary sloughs including Georgianna Slough, Barker Slough, Lindsey Slough, and Parker Island. Riparian, wetland, and terrestrial habitat would also be restored on Delta islands and upland areas adjacent to river channels.

Sacramento River Habitat Restoration— Restore habitat and geomorphic processes along the Sacramento River upstream of the Delta to increase survival and spawning success of anadromous fish, and to provide other benefits. Construct segments of meander belt where feasible (such as Red Bluff to Colusa) and restore segments of riparian habitat in more controlled stretches of the river (Colusa to Knights Landing).

San Joaquin River Habitat Restoration— Restore channel features to improve fish survival. Actions may include restoration of deeper, narrower channel areas to keep water cooler, and isolation of quarry areas to protect young fish from predation and straying.

Bay Habitat Restoration— Restore about 5,000 acres of tidal wetlands between Collinsville and Carquinez Strait. Actions may include conversion of diked wetlands to tidal wetlands or use of dredge spoils to create wetland areas. The resulting habitat types will provide wet year spawning habitat for Delta smelt, rearing areas for salmon, as well as habitat for diverse wildlife including canvasback and redhead ducks.

Channel Islands— Restore and protect channel islands. Evaluate contribution of upstream meander belts to sediment deposition at channel islands. Establish zones for different types of boating use so some areas are protected from large boat wakes.

Install Bypass at Mouth of Old River— Construct a bypass at the mouth of Old River that will encourage outmigrants to stay in San Joaquin River while allowing a managed flow down Old River.

Fish Screens— Increase the efficiency at screens associated with the CVP and SWP export facilities. Install fish screens on diversions over 100 cfs that are on fish migration routes in the Delta, rivers, and tributaries.

Other Programs— Implement recommended habitat restoration actions from other programs, including CVPIA and the Anadromous Fish Restoration Plan. Examples of specific actions include small dam removal on Clear Creek, dam removal on Battle Creek, establishment of a population of winter run chinook salmon on Battle Creek.

Flood Protection Level— Action provides a moderate level of protection to Delta system levees. First, all levees not yet providing a level of protection equivalent to the hazard mitigation plan (HMP) will receive the necessary upgrades to their levees to meet HMP standards. A level of flood protection equivalent to the US Army Corps of Engineers' Public Law (PL)- 99 standard would be provided to: (1) critical western Delta islands (such as Sherman and Jersey islands), with important regional infrastructure (e.g. the Mokelumne Aqueduct, transmission lines, Highway 160, etc.); (2) other islands having infrastructure of local importance (such as New Hope Tract, Bouldin Island, Sherman Island, Palm Tract, Lower and Upper Jones Tracts, and Lower Roberts Island); and (3) islands having valuable habitat, but not necessarily infrastructure, (including, but not necessarily limited to Canal Ranch, Brack Tract, Staten Island, Venice Island, Rindge Tract, Webb Tract, Big Mandeville Island, Twitchell Island, and Bradford Island).

Channel Improvements and Levee Maintenance— A moderate level of channel improvements (e.g. widening for improved conveyance), levee maintenance and stabilization (e.g. stabilizing berms), the modification of agricultural practices to reduce subsidence potential, setback levees, providing funding for maintenance and stabilization, and maintaining and/or reconstructing levees are indicative of the range of actions that would be implemented with the intent of reducing the risk of the Delta levee system with respect to its value in providing water supply, water quality, ecosystem quality, and land use/infrastructure benefits.

Operational and Management Features

Water Transfers— Develop transferrable supplies from well integrated conjunctive use programs. Conjunctive use programs would be developed in the Sacramento and San Joaquin Valleys to develop dependable transfer supplies. The program would provide assistance to local agencies to develop groundwater resources and participate in surface water and groundwater substitution programs. Conjunctive use programs would also be monitored to ensure that basins are not over-drafted or water quality is not degraded. It is estimated that such a program could yield up to 500 TAF of annual supply. Transfer water would be secured through a fallowing program that can be implemented during drought periods. Opportunities for transfers to exporters would be increased by modified export operations which increase pumping in the winter, thereby freeing up export capacity in the summer months. To ease the implementation of water transfers a programmatic environmental impact statement (PEIS) would be prepared to define criteria for transferring water through the Delta. The PEIS would also identify appropriate and streamlined refill impact criteria.

Delta Real-Time Management Program— Develop a real-time management program for efficient operations of the Delta Cross Channel, migration barriers, export and Delta outflows, fish salvage operations and hatchery programs. Such a management program should consider the appointment of a Delta water master to oversee the effective management of Delta programs related to movement of water for export, local diversion, and environmental needs.

In-Lieu Groundwater Banking— To provide additional insurance for drought conditions and to provide assistance to the current over-draft conditions in the San Joaquin Valley and the Tulare Basin, an in-lieu groundwater program would be developed. Under this program surface water would be provided to irrigators who currently rely on groundwater in areas that are in over-draft. Surface water provided to groundwater-dependant irrigators would be considered stored as forgone groundwater extractions. During periods of drought or other deficiencies in the ability of the projects to serve surface water, these irrigators would return to groundwater extraction. This would reduce the demand for water during critical periods.

Obtain Environmental Water— Obtain about 100,000 acre feet from San Joaquin water users to reduce conflicts between fisheries and diversions. Water could be used to provide pulse flows to move Delta smelt downstream, away from diversion points.

Another use might be dilution of poor quality San Joaquin River flows, providing benefits for fisheries, water supply, and water quality. New south-of-Delta storage would allow this water to be used as exchange water so that Delta diversions could be reduced at critical times to protect fisheries without affecting export supplies.

Conservation— Best Management Practices (BMPs) for the urban sector will be improved and requirements for their implementation will become more stringent. Additional BMPs will include such actions as requiring inclining block rates to encourage reduced use in landscape irrigation and increased efficiency in-home water using appliances. BMPs for industrial users will also be improved as will their requirements for implementation. In the agricultural sector Efficient Water Management Practices (EWMPs) will be improved to include installation of measurement devices and water pricing structures to encourage optimum management and efficient use of water.

Reclamation— Implement reclamation and reuse projects for urban and agricultural supplies were feasible. The state and federal projects could co-sponsor projects that would increase the efficient reuse of water and decrease demand or ensure predictability for water supplies in state and federal water service areas. Examples of projects be the use of grey water for landscape irrigation in urban areas, particularly areas of new development, and reclamation projects that would supply local agricultural users with reclaimed water. The emphasis would be on local projects.

Reduce Fish Entrainment and Losses at CVP and SWP Facilities— Reduce entrainment and mortality of fish at Banks and Tracy pumping plants. Measures to reduce entrainment and losses should include:

- Improve fish salvage and handling.
- Monitor entrainment on a real time basis to identify periods of peak susceptibility of various species.
- Control predation at both facilities.
- Coordinate operations of two diversions, including interchangeable pumping, to reduce combined losses.

Hatchery Management— Increase hatchery production for fall run chinook salmon on the San Joaquin River or its tributaries. Increased hatchery production will help re-establish the fall run.

Institutional and Policy Features

Delta Export Criteria— Change Delta export criteria to enable greater exports during periods of high winter Delta flows. Increase the regulatory constraints during a winter window that has the least environmental impacts and is coordinated with high flows in the Delta. Regulatory changes could also include tradeoff pumping incentives where the ability to operate the export facilities at full capacity during acceptable winter months would correspond to a reduction in exports during more environmentally sensitive periods. Such changes may increase the predictability of export supplies by shifting a large portion of export pumping away from sensitive periods that currently constrain pumping activities.

Increase Permitted Capacity of Delta Export Facilities— To maximize operation of additional off-stream storage south of the Delta, the current permitted capacity of the SWP and CVP export facilities would need to be increased during the winter months to their physical capacity or the maximum capacity possible that still allows instream flow conditions conducive to protecting sensitive species. The changes in the permitted capacity would correspond to changes Delta export criteria.

Sacramento River Habitat Restoration— Restore habitat and geomorphic processes along the Sacramento River upstream of the Delta to increase survival and spawning success of anadromous fish, and to provide other benefits. Construct segments of meander belt where feasible (such as Red Bluff to Colusa) and restore segments of riparian habitat in more controlled stretches of the river (Colusa to Knights Landing).

Sacramento River Habitat Restoration Feasibility— Restore riparian, shaded riverine, and shallow water habitat along the Sacramento River from Sacramento to Collinsville. First step will be to provide matching funds for Corps of Engineers feasibility study. Subsequent restoration would be funded 75% by COE.

Subsidence Reduction— Efforts to reduce the subsidence on Delta islands with deep peat soils (such as parts of Grand, Twitchell, Sherman, Andrus, and Bouldin islands) will include the establishment of a landside buffer zone between 50 and 100 yards in width, located adjacent to the levee.

Emergency Levee Management Plan— An emergency levee management plan would provide necessary funding and direction to reclaim Delta islands in the event of inundation to continue protection of Delta functions as an integrated resource system.

Funding would be provided to ensure that a suitable amount of equipment and materials would be readily available to rapidly respond to flood fights.

Preliminary Assessment

Benefits

Ecosystem Quality— While this alternative continues to rely on the Delta to facilitate the movement of water from the north to the south, which has negative impacts to Delta ecosystem quality, a large number of habitat restoration and protection measures have been included. This alternative would greatly improve ecosystem quality through restoration and enhancement of riverine, riparian, wetland, and terrestrial habitats. Expansion of floodway habitat, channels, and meander belts in the Bay-Delta and in upstream tributaries would help to restore fish and wildlife spawning, rearing, and feeding habitats and improve fish survival. Modified operations of the Delta export facilities would reduce the impacts of current export operations on fish survival in the Delta.

Water Supply— This alternative focuses on shifting the timing of a large portion of Delta exports by the SWP and CVP to a period of reduced impacts on the Delta environment. By increasing the project diversions to the winter months to fill off-stream storage facilities, the availability of supplies from upstream reservoirs is increased. By filling Delta storage when the Delta is in excess conditions, and generally prior to seasonal filling of upstream reservoirs, the demand for export water during the spring and summer period is reduced. This reduction in export demand increases the availability of water stored in upstream reservoirs for environmental uses or for transfers. This scenario of operation would also increase the availability of export capacity which could be utilized for transfers. Water supplies would be further secured through development of an in-lieu surface water - groundwater program which would in effect store groundwater in currently over-drafted basins. This stored groundwater could be called upon during dry conditions to reduce the demand for exports out of the Delta. Demand management programs would be instituted in the urban, industrial and agricultural sectors to increase the efficient use of existing water allocations.

Water Quality— Water quality would be improved through implementation of core actions. Key actions implemented to the maximum levels feasible would be to control agricultural drainage. Changes in agricultural drainage management to

reduce the overall pollutant loads of the system would be preferred, including modifications to agricultural practices to reduce the discharge of pollutants.

System Reliability— System reliability is improved in this alternative, above the current levels. Because this alternative continues to rely on water exports in the south Delta, the level of levee protection would be increased to an appropriate level to reduce the risk of catastrophic failures that would interrupt supply availability.

Constraints and Concerns

This alternative will continue to rely on the south Delta export facility. Doing so will continue to have impacts on Delta aquatic species, particularly impacts associated with export diversion. Small Delta diversion for agricultural irrigation will continue to operate which continues impacts associated with those diversions. Water quality, both for the environmental and export needs is not significantly improved by this alternative. While the reliability of export water is slightly improved through levee improvements, there remains a risk of interruption due to levee failures or Delta island flooding.